	Application No.	Applicant(s)
Notice of Allowability	10/697,128	ALVERSON ET AL.
	Examiner	Art Unit	
	ABDULLAH AL KAWSAR	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *03/05/2009 and interview conducted on 04/28/2009*.

2. ☒ The allowed claim(s) is/are *1-29,36-50,53-56 (renumbered as claims 1-48)*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some*   c) ☐ None   of the:

        1. ☐ Certified copies of the priority documents have been received.

        2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

        3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the

           International Bureau (PCT Rule 17.2(a)).

    * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.

    (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached

        1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____ .

    (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of

        Paper No./Mail Date _____ .

    Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)

2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)

3. ☒ Information Disclosure Statements (PTO/SB/08),
    Paper No./Mail Date 02/09/2009

4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material

5. ☐ Notice of Informal Patent Application

6. ☒ Interview Summary (PTO-413),
    Paper No./Mail Date *20090428* .

7. ☒ Examiner's Amendment/Comment

8. ☒ Examiner's Statement of Reasons for Allowance

9. ☐ Other _____ .

/VAN H NGUYEN/
Primary Examiner, Art Unit 2194

<center>**EXAMINER'S AMENDMENT**</center>

1.   An examiner's amendment to the record appears below. Should the changes and/or

additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR

1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the

payment of the issue fee.

2.   Authorization for this examiner's amendment was given in a telephone interview with

Maurice J. Pirio, Reg.# 33,273 on 04/28/2009.

3.   **This listing of claims will replace all prior versions and listings of claims in the**

application:

        1.   (Currently Amended) A method in a computer system having a processor and a

memory for implementing a circular buffer having a size, comprising:

        providing a buffer having a plurality of words in the memory, each word having an

                associated disabled forwarding bit;

        providing a pointer pointing to a word within the buffer;

        providing a number of forwarding words located adjacent to an end of the buffer in the

                memory, each forwarding word having an associated enabled forwarding bit and

                each forwarding word storing a pointer to a word within the buffer, the first

                forwarding word storing a pointer pointing to the first word in the buffer, each

                subsequent forwarding word storing a pointer pointing to the word in the buffer

immediately following the word in the buffer pointed to by the pointer stored in

the immediately preceding forwarding word, wherein the number of forwarding

words is less than or equal to the number of words in the buffer;

receiving from the processor a request to access a number of sequential words ~~starting at~~

~~the word pointed to by~~ wherein a starting position for accessing data in the buffer

is based on the pointer modulo the size of the buffer, a maximum number of

words of the buffer to be accessed at a time corresponding to the number of

forwarding words;

selecting the word pointed to by the pointer modulo the size of the buffer;

for each word to be accessed, starting with the selected word,

retrieving the forwarding bit associated with the word to be accessed,

when it is determined that the retrieved forwarding bit is disabled, accessing the

word directly, and

when it is determined that the retrieved forwarding bit is enabled, retrieving the

pointer stored in the word and directing the access to the word within the

buffer pointed to by the retrieved pointer; and

incrementing the pointer by the number of words being accessed

so that the buffer ~~can be~~ is accessed without checking for the end of the buffer.

2.   (Original) The method of claim 1 wherein the buffer is pointed to by a write

pointer whose value modulo a size of the buffer indicates the starting position for storing data in

the buffer.

3.   (Original) The method of claim 1 wherein the buffer is pointed to by a read pointer whose value modulo a size of the buffer indicates the starting position for reading data from the buffer.

4.   (Original) The method of claim 1 wherein the access is a read.

5.   (Original) The method of claim 1 wherein the access is a write.

6.   (Original) The method of claim 1 wherein the access is using a pointer.

7.   (Original) The method of claim 6 wherein the pointer is a write pointer.

8.   (Original) The method of claim 6 wherein the pointer is a read pointer.

9.   (Original) The method of claim 6 wherein the pointer has a synchronization access mode.

10.   (Previously Presented) The method of claim 9 wherein the synchronization access mode is sync.

11.   (Previously Presented) The method of claim 9 wherein the synchronization access mode is normal.

12.   (Previously Presented) The method of claim 9 wherein the synchronization access mode can be set.

13.   (Original) The method of claim 1 wherein the access does not include code for detecting the end of the buffer.

14.   (Original) The method of claim 1 further comprising:

when adding data to the buffer,

> receiving an indication of data to be written, the data having a size;
>
> fetching a write pointer;
>
> adding an indication of the size of the data to the write pointer; and
>
> copying the data into the buffer starting at a location indicated by the fetched write pointer.

15.   (Original) The method of claim 14 wherein the fetching and adding includes executing a fetch and add operation.

16.   (Original) The method of claim 14 wherein when the copying would occur in a word located past an end of the buffer, the copying automatically circles to the other end of the buffer.

17.   (Original) The method of claim 14 wherein the adding includes calculating a modulo of a sum of the addition and a size of the buffer.

18.   (Original) The method of claim 1 further comprising:

when reading data from the buffer,

      receiving an indication of a location where read data is to be stored;

      fetching a read pointer;

      reading a size of the data to be read from the buffer; and

      copying data from the buffer to the indicated location.

19.   (Original) The method of claim 18 further comprising setting the read pointer to a sum of the read pointer and the size of the data modulo a size of the buffer.

20.   (Original) The method of claim 18 wherein the read pointer is accessed with a synchronization access mode of sync.

21.   (Original) The method of claim 18 wherein the data is read from the buffer using an access control mode of the read pointer.

22.   (Original) The method of claim 1 wherein when the access has a synchronization access mode of sync, read access to a location in the buffer is permitted only when the location is full.

23.   (Original) The method of claim 22 wherein after the read access, the location is set to empty.

24.   (Original) The method of claim 1 wherein when the access has a synchronization access mode of sync, write access to a location in the buffer is permitted only when the location is empty.

25.   (Original) The method of claim 24 wherein after the write access, the location is set to full.

26.   (Original) The method of claim 1 including storing a pointer to an invalid location in a location adjacent to the forwarding words with forwarding of that location enabled so that when the location adjacent to the forwarding words is accessed, an exception is raised.

27.   (Original) The method of claim 1 wherein the buffer is accessed by multiple readers and writers.

28.   (Original) The method of claim 1 wherein the buffer is accessed by multiple producers.

29.   (Original) The method of claim 1 wherein the buffer is accessed by multiple consumers.

30. – 35. (Canceled)

36.   (Currently Amended) A computer system for implementing a circular buffer having a size, the computer system having a processor, the system comprising:

a buffer having a plurality of words, each word in the buffer having an associated
forwarding bit that is disabled;

a component that stores in each of a set of forwarding words located adjacent to an end of
a buffer, an address of a location within the buffer, ~~wherein~~ the first forwarding
word storing a pointer pointing to the first word in the buffer, each subsequent
forwarding word storing a pointer pointing to the word in the buffer immediately
following the word in the buffer pointed to by the pointer stored in the
immediately preceding forwarding word and wherein the number of forwarding
words is less than or equal to the number of words in the buffer;

a component that enables a forwarding bit associated with each of the forwarding words;

a component that receives a request to access a number of sequential words, ~~starting at
the word pointed to by~~ wherein the starting position for accessing the buffer is
determined based on an access pointer modulo the size of the buffer;

a component that selects the word pointed to by the access pointer modulo the size of the
buffer;

a component that, for each word to be accessed starting with the selected word,
retrieves the forwarding bit associated with the word to be accessed,
when it is determined that the retrieved forwarding bit is disabled, accesses the
word directly, and
when it is determined that the retrieved forwarding bit is enabled, retrieves the
pointer stored in the word and directs the access to the word within the
buffer pointed to by the retrieved pointer; and

a component that increments the access pointer by the number of words accessed so that

the incremented pointer points to a location for the next access.

37.   (Original) The system of claim 36 wherein the buffer is accessed by multiple

readers and writers.

38.   (Original) The system of claim 36 wherein the buffer is pointed to by a read

pointer whose value modulo a size of the buffer indicates the starting position for reading data

from the buffer.

39.   (Original) The system of claim 36 wherein the access is a read.

40.   (Original) The system of claim 36 wherein the access is a write.

41.   (Original) The system of claim 36 wherein the access is using a pointer.

42.   (Original) The system of claim 41 wherein the pointer is a write pointer.

43.   (Original) The system of claim 41 wherein the pointer is a read pointer.

44.   (Original) The system of claim 41 wherein the pointer has a synchronization

access mode.

45.   (Previously Presented) The system of claim 44 wherein the synchronization access mode is sync.

46.   (Previously Presented) The system of claim 44 wherein the synchronization access mode is normal.

47.   (Previously Presented) The system of claim 44 wherein the synchronization access mode can be set.

48.   (Original) The system of claim 36 wherein the access does not include code for detecting the end of the buffer.

49.   (Currently Amended) A ~~computer-storage~~ computer storage medium containing instructions for implementing a circular buffer having a size that when executed by a computer causes the computer to perform the steps of, ~~comprising~~:

> providing a buffer with storage locations, each storage location having an associated forwarding bit that is disabled, wherein the buffer has a beginning and an end and ~~having~~ an access pointer pointing to the next ~~word~~ storage location to be accessed, such that when the buffer is accessed, the access pointer is incremented by the number of ~~words~~ storage locations being accessed so that the access pointer points to a storage location for the next access;
>
> providing a number of forwarding words adjacent to the end of the buffer, each forwarding word having an associated forwarding bit that is enabled, the first

forwarding word storing a pointer pointing to the first ~~word~~ storage location in the

buffer, each subsequent forwarding word storing a pointer pointing to the ~~word~~

storage location in the buffer immediately following the ~~word~~ storage location in

the buffer pointed to by the pointer stored in the immediately preceding

forwarding word, wherein the number of forwarding words is less than or equal to

the number of storage locations in the buffer; ~~and~~

receiving a request to access a number of storage locations, wherein a starting position

for accessing storage locations in the buffer is determined based on the access

pointer modulo the size of the buffer;

selecting the storage location pointed to by the access pointer modulo the size of the

buffer;

for each storage location to be accessed, starting with the selected storage location,

when the storage location to be accessed is not a forwarding word, accessing the

storage location directly, and

when the storage location to be accessed is a forwarding word ~~is accessed~~,

retrieving the pointer stored in the forwarding word and directing the

access to the ~~word~~ storage location within the buffer pointed to by the

retrieved pointer; and

incrementing the access pointer by the number of storage locations accessed.

50.   (Currently Amended) The ~~computer storage~~ computer storage medium of claim

49 further comprising multiple forwarding words wherein each forwarding word has a pointer to

a storage location.

51.   (Cancelled)

52.   (Cancelled)

53.   (Currently Amended) The ~~computer-storage~~ computer storage medium of claim 49 wherein the access pointer is a read pointer.

54.   (Currently Amended) The ~~computer-storage~~ computer storage medium of claim 53 wherein the value of the read pointer modulo a size of the buffer indicates a starting position for reading data from the buffer.

55.   (Currently Amended) The ~~computer-storage~~ computer storage medium of claim 49 wherein the access pointer is a write pointer.

56.   (Currently Amended) The ~~computer-storage~~ computer storage medium of claim 55 wherein the value of the write pointer modulo a size of the buffer indicates a starting position for storing data in the buffer.

57. – 62. (Canceled)

Reason for Allowance

4.   The following is an examiner's statement of reasons for allowance:

Niu et al. (US Patent No. 6,473,818) teaches a network interface device using circular buffer as transmit and receiving buffer. The circular buffer having a size and read, write pointer

for read and write access. When the circular buffer reaches the end of the buffer it wrap's around

to the beginning of the buffer. The read, writer pointer used a modulo counter that is relative to

the size of the buffer to indicate the beginning address for accessing the buffer

Soell et al. (US Patent No. 5,923,900) teaches a circular buffer that extends beyond the

last entry position of the buffer. The circular buffer has virtual address allocates as the size of the

buffer adjacent to the last entry of the buffer. The virtual entry position in the circular buffer is

occupied to maintain the sequential priority of the entries.

The cited prior art references do not teach each forwarding word having an associated

enabled forwarding bit and each forwarding word storing a pointer to a word within the buffer,

the first forwarding word storing a pointer pointing to the first word in the buffer, each

subsequent forwarding word storing a pointer pointing to the word in the buffer immediately

following the word in the buffer pointed to by the pointer stored in the immediately preceding

forwarding word, wherein the number of forwarding words is less than or equal to the number of

words in the buffer; and for each word to be accessed, starting with the selected word, retrieving

the forwarding bit associated with the word to be accessed, when it is determined that the

retrieved forwarding bit is disabled, accessing the word directly, and when it is determined that

the retrieved forwarding bit is enabled, retrieving the pointer stored in the word and directing the

access to the word within the buffer pointed to by the retrieved pointer

5.   Any comments considered necessary by applicant must be submitted no later than the

payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for

Allowance."

Conclusion

6.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ABDULLAH AL KAWSAR whose telephone number is

(571)270-3169. The examiner can normally be reached on 7:30am to 5:00pm, EST.

7.   If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng Ai T. An can be reached on 571-272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

8.   Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/VAN H NGUYEN/   /Abdullah-Al Kawsar/
Primary Examiner, Art Unit 2194   Examiner, Art Unit 2195